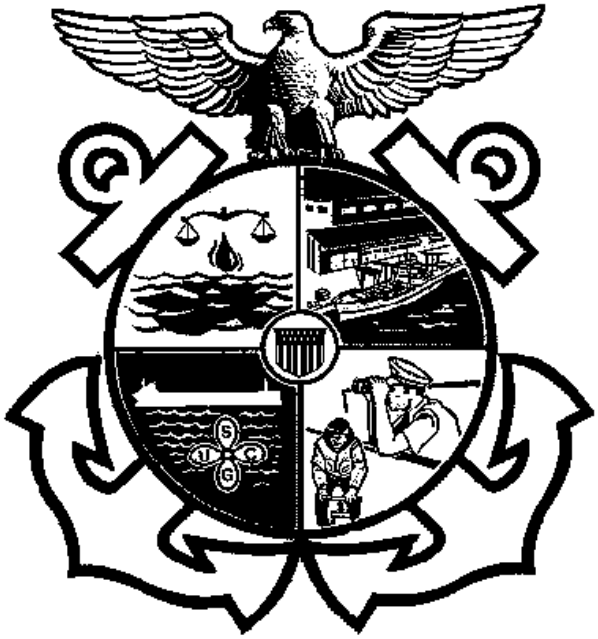
Machinery Inspector (MI)



PQS Workbook

MI Qualification
Task Matrix

TSK #	TASK	DATE
AC07	Inspect paint lockers.	
AC08	Inspect ladders, railways, and gangways.	
CS04	Inspect components installed in designated hazardous locations.	
CS08	Inspect cargo pumproom(s).	
CS12	Ensure vessel's IGS/COW operations/equipment manual was reviewed.	
CS14	Inspect the COW equipment.	
CS15	Inspect the vessel's letter of acceptance for installed IGS/COW system.	
CS16	Inspect the vessel's IGS/COW operations/equipment manual entries.	
CS17	Examine IGS equipment and verify that it is properly installed.	
CS18	Witness IGS operational test of safety shutdowns and controls.	
CS19	Witness IGS operational test of visual and/or audible alarms.	
CS20	Witness operational test of IG blower shutdown for various conditions.	
ES01	Inspect switchboards.	
ES02	Inspect ship's service generators.	
ES04	Inspect emergency generators.	
ES05	Inspect battery installation.	
ES06	Inspect motor controllers.	
ES07	Ensure lighting systems/fixtures are adequate and meet requirements.	
ES09	Ensure receptacle outlets are properly grounded.	
ES10	Inspect distribution panels.	
ES12	Survey/inspect electrical cable installation.	
ES13	Test power operated watertight doors from local/remote control units.	
ES14	Test/inspect internal communication and control systems.	
ES16	Inspect components installed in designated hazardous locations.	
ES18	Inspect the general alarm system emergency batteries.	
ES19	Perform operational test of remote ventilation shutdowns.	
FF01	Determine amount, type, location of fire protection equipment required.	
FF02	Inspect CO2 systems.	
FF06	Inspect Halon systems.	

MI Qualification
Task Matrix

TSK #	TASK	DATE
FF08	Inspect semi-portable firefighting equipment.	DATE
FF09	Inspect portable firefighting equipment.	
FF10	Inspect fire main and fire stations.	
FF13	Witness operational test of fire detection system.	
FP01	Verify that required forms, placards and notices are posted.	
II05	Discuss scope of inspection with owner's representative.	
II06	Obtain CG-2692 for reportable marine casualties.	
II07	Examine gas-free certificate.	
II09	Review any outstanding CG-835s and ask if other deficiencies exist.	
LS05	Inspect life preservers.	
LS07	Inspect survival suits.	
MI01	Determine condition of the components of the steering gear assembly.	
MI04	Inspect fuel oil service and transfer system.	
MI06	Inspect bilge pumps installation, piping, and valves.	
MI08	Examine refrigeration/air conditioning machinery.	
MI09	Examine potable water system.	
MI10	Observe operational tests of machinery.	
MI13	Inspect the diesel installation and assembly.	
MI16	Inspect air starting systems.	
MI17	Inspect hydraulic starting systems.	
MI18	Inspect electric starting systems.	
MI19	Witness operational test of main propulsion diesel automation.	
MI22	Internally examine UPVs requiring internal examination.	
MI23	Externally examine UPVs.	
MI24	Hydrostatically test UPVs requiring hydrostatic testing.	
MI25	Ensure all UPVs are properly equipped with pressure relief valves.	
MI26	Witness pressure relief valve test.	
PP04	Conduct IOPP boarding and survey.	
RT01	Complete Initial Indoctrination Lesson Plan Series (IILPS).	

MI Qualification
Task Matrix

TSK #	TASK	DATE
RT02	Complete Inspection Department Course.	
RT06	Complete SMI Introduction Course.	
RT08	Complete SMI Machinery Course.	
WI01	Inspect watertight doors.	
WI02	Test power-operated watertight doors from local/remote control units.	
WI03	Inspect watertight bulkhead penetrations.	
WI05	Inspect remote-operated valves and controls.	
WI06	Inspect bilge wells and "rose boxes."	
WI07	Inspect hull and deck openings.	
WR01	Evaluate welding repair proposal.	
WR02	Complete initial visual inspection of weld repair.	
WR03	Complete intermediate visual inspection of weld repair.	
WR04	Complete final visual inspection of weld repair.	
WR05	Witness pressure testing of welded repairs.	
WR06	Examine approved WPS and WPQ.	

Trainee's OJT Manual has been reviewed and I recommend a training qualification board be scheduled.

Training Officer: _____

Date: _____

Date Qualification Board Completed: _____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
AC07	Inspect paint lockers. • Required fire protection equipment provided in accordance with applicable regulations and vessel's approved fire safety plan • Space(s) designated constructed of or wholly lined with metal • Space(s) well vented and means provided to secure ventilation if necessary	_____	_____
AC08	Inspect ladders, rails and gangways. • An approved pilot ladder provided and maintained in good repair • Accommodation ladder of sufficient size provided to be used when distance from sea level to vessel's deck is more than 30 feet • "Rails" are provided on accommodation ladders, when used	_____	_____
CS04	Inspect components installed in designated hazardous locations. • Cable runs inboard and clear of cargo tank openings • Electrical components used in cargo pumproom intrinsically safe • Storage batteries located in cargo handling areas • Lights in pump rooms use gas tight lenses or intrinsically safe units • Electrical components on the weather deck located within ten feet of cargo tank openings, tank vents or doors, explosion proof	_____	_____
CS08	Inspect cargo pumproom(s). • Pumproom access doors open onto the weatherdeck • Ladders and accesses allow individuals wearing breathing apparatus entry • Hoisting system provided from the pump room to the main decks • Discharge pressure gauge for each pump located outside the pump room • Bilge pumping system with remote control and high level alarms provided • Air changed with proper frequency by the power ventilation system	_____	_____
CS12	Ensure that vessel has an IGS/COW operations and equipment manual and that it has been reviewed by the Coast Guard or, after 1 JUN 82, by ABS.	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
CS14	Inspect COW piping, valves and fittings, tank washing machines, pumps and stripping system to ensure they are properly constructed, installed, and maintained. • Dirty ballast transfer pumps and piping • Fixed piping for COW • Oily residue tank • Oil discharge/monitoring control system • Coast Guard approved plans • Permanently mounted COW machines and piping • Overpressure relief valves • Spectacle flanges • One portable drive unit for each three COW machines • Pumps of sufficient capacity to drive system • Two or more pumps capable of supplying oil to the COW • Stripping capacity in each tank 1.25 times the rate of the COW pumps • Means to isolate stripping pump from cargo tank • Pump monitoring device	_____	_____
CS15	Inspect the vessel's letter of acceptance for the installed IGS/COW system issued by the Coast Guard or ABS.	_____	_____
CS16	Inspect the vessel's IGS/COW operations and equipment manual for entries for required inspections and details of operations conducted.	_____	_____
CS17	Examine the following IGS equipment and verify that it is installed properly. • Flue gas isolation valve working • Soot blower/flue gas interlock • Gas scrubber with water seal and 2 sources of water supply • Two blowers • Shut-off valves on suction and discharge side of blowers • The following instrumentation: – IG temperature – IG pressure – Oxygen content in IG • Means to calibrate instruments • Automatic gas regulatory valve • Two non-return devices • Gas main isolation valve • Deck water seal • Pressure/vacuum protection • Portable instruments to measure oxygen and flammable vapors	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
	• Piping, drains		
CS18	Witness the IGS operational test of safety shutdowns and controls. • Soot blower/fuel gas isolation valve interlock • Automatic gas regulatory valve – Upon blower failure – Upon loss of water pressure to deck water seal – Upon loss of control power – Upon low water/high water in scrubber – High IG temperature • Backflow pressure test	_____	_____
CS19	Witness IGS operational test of visual and/or audible alarms. • Low IG pressure • Oxygen content in IG - move them 8% • Loss of water supply to deck water seal • High IG temperature • Loss of water supply to scrubber • High water level in scrubber • IG blower failure • Power failure to automatic gas regulating valve • High IG pressure	_____	_____
CS20	Witness operational test of the IG blower shut down for the following conditions: • Loss of water supply to deck water seal • High IG temperature • Low water level/flow in scrubber • High water level in scrubber • Remote outside of space	_____	_____
ES01	Inspect switchboards. • Nonconductive mat on deck in front of board • Nonconductive rails on board face • Nonconductive rails at the rear and sides • Dripshield on the board's top • Ground detection indicators working with no grounds indicated • Meters calibrated and working • Synchronizing controls working. • Identification for controls and meters • Area is dry and clean • Working space is provided in accordance with regulations • Overcurrent protection properly labeled	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
ES02	Inspect ship's service generators. • Generators of a size or arrangement which require overspeed trips • Operational test of overspeed trips and alarms within specified limits • If the DC or AC generators operate in parallel, are the reverse power/current trips working • Guards installed around rotating or live machinery • Discoloration from overheating apparent • Filters on air intakes working to keep internals free from dust and dirt • Windings oily or dirty • Odd bearing noises present • Voltage regulated within limits specified by CFR • Working diesel low lube oil pressure trip and alarms • Working high temperature detectors and alarms for AC generators • Nameplates properly in place	_____	_____
ES04	Inspect emergency generator. • Means of starting is provided • The following alarms/shutdowns are operable: – Low lube oil pressure – High cooling water temperature – Overspeed – Fixed firefighting system shutdown • The generator auto-start circuit functions and the generator can power its full-rated load within 20 seconds and accept the final emergency load within 45 seconds of loss of the normal power supply • Independent fuel supply is provided, with remote shut-off valve installed and properly marked	_____	_____
ES05	Inspect emergency batteries. • Size of installation and required ventilation • Battery box is properly lined • Batteries are secure in the trays • Adequate space is provided over the cells • A means of charging is provided • Conductor overcurrent protection is provided • Ventilation/charger interlocked	_____	_____
ES06	Inspect motor controllers. • Units are installed in suitable cases, or if open type, within limited access enclosure • Wearing parts are accessible • Controls are marked for each motor served • Wiring diagram is affixed to the controller enclosure	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
	• Motor controllers are drip-proof/watertight		
ES07	Ensure lighting systems and fixtures are adequate and meet regulations. • Passageways and public areas • Machinery spaces • Passenger and crew spaces • Berth lights • Exit lights • Pilot ladders • Navigation • Signaling lights • Lifeboat and liferaft embarkation stations	_____	_____
ES09	Ensure receptacle outlets have grounding poles and are properly grounded.	_____	_____
ES10	Inspect distribution panels. • Circuit directory provided • Amperage ratings of the protective devices in accordance with required circuit directory • Panelboard blanks installed, where necessary	_____	_____
ES12	Survey electrical cable installation and determine: • Vertical and horizontal supports properly spaced • Radius of the bends exceed CFR specifications • Portable cables used for unauthorized purposes • Acceptable materials used • Hazardous conditions exist (jury rigs, dead end cables, splices, etc.)	_____	_____
ES13	Test power-operated watertight doors from local and remote control units.	_____	_____
ES14	Test internal communication and control systems and ensure the following systems work properly. • General alarms (bells and contractors) • Sound powered phones to all required stations • Engine order telegraph and wrong direction alarm • Public address system • Engineer's assistance needed alarm • Engineer's call system • Fire detection/fire alarm system • Refrigerated space alarm system	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
ES16	Inspect components installed in designated hazardous locations and ensure explosion proof installation. • Fuel purifier rooms • Paint locker • Cargo area • Pumprooms	_____	_____
ES18	Inspect the general alarm system emergency batteries.	_____	_____
ES19	Inspect ventilation systems and perform operational test of alarms and remote ventilation shutdowns.	_____	_____
FF01	Determine amount, type and location of fire protection equipment required. • By the vessel's Certificate of Inspection • By the respective regulations	_____	_____
FF02	Inspect fixed CO_2 systems. • Test sirens and time delays • Obtain servicing reports • Bottles underweight • Flexible loops serviced and tested • Diffuser heads clear • Access to CO_2 room free of obstruction • Hydrostatic test required by regulations • Instructions posted	_____	_____
FF06	Inspect Halon systems. • Coast Guard approved • Markings and notices correct and properly posted • Controls functioning • Closure for protected spaces provided • Quantity sufficient • Vent and engine shutdowns functioning	_____	_____
FF08	Inspect semi-portable fire fighting equipment. • Installation approved • System serviceable • Instructions posted • Correct type and amount on hand • Markings correct	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
FF09	Inspect portable firefighting equipment. • Fire extinguishers approved • Each unit serviceable • Adequate spare charges provided • Correct type and amount on hand • Distributed per fire control plan • Markings correct • Servicing properly logged	_____	_____
FF10	Inspect fire main and fire stations. • Correct number of fire pump(s) provided • Fire hoses meet acceptable standards • Equipment provided at each required fire station pursuant to regulations • Requirements for hose length and size at each fire station complied with • Fire pump(s) capable of providing adequate pressure to highest and most remote fire station using pitot tube • Pressure gauge installed on discharge side of fire pump • Fire hoses serviceable after hydro testing • Valves at fire stations operable • Fire main(s), hose(s), and equipment compatible at each station • Approved nozzles and applicators provided for each fire station • Fire pump relief valve functions properly • Markings correct	_____	_____
FF13	Witness operational test of fire detection system. • System serviceable • All sensors free of obstructions and functioning • Alarms and indicators functioning correctly • Required instructions and diagrams provided • Markings correct	_____	_____
FP01	Verify that the required forms, placards, and notices are posted. • Pollution/MARPOL: – Placard – Waste management plan • Coast Guard forms: – CG-809: Station bills, drills – CG-811: Lifesaving signals and instructions – CG-841: Certificate of Inspection – CG-848: Station Bill	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
FP01 (cont'd.)	– CG-2832: Vessel Inspection Record – CG-3372: Oil Pollution • Passenger notices • Plans posted: – General arrangement – Fire control plan • Rules and regulations for class of vessel • SOLAS certificates • Markings: conspicuous and legible		
II05	Discuss scope of inspection with owner's representative. Decide on general sequence of inspection.	_____	_____
II06	Obtain CG-2692 for reportable marine casualties/ structural failure report.	_____	_____
II07	Examine gas-free certificate issued by an NFPA-certified marine chemist for hot work and/or confined space entry. • Information on the gas-free certificate meet the requirements of NFPA Standard 306 and Coast Guard confined space entry/benzene exposure policy • Gas-free certificate been maintained by a designated competent person and records kept as required by OSHA regulations • Marine chemist certified by NFPA • Review benzene and confined space entry policies	_____	_____
II09	Review any MSIS inspection notes and outstanding deficiencies (CG-835s). Ask owner's representative if any other deficiencies exist.	_____	_____
LS05	Inspect life preservers. • Properly equipped with lights, whistles and reflective tape • Approved for intended service • Sufficient serviceable units aboard and properly stowed • Properly marked	_____	_____
LS07	Inspect survival suits. • Equipped as required • Physically serviceable • Sufficient number of units aboard and properly stowed	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
MI01	Determine condition of the following components of the steering gear assembly: • Insides of motor controller and switch gear boxes • Mounting bolts for all equipment (vibration) attachments, links and pins • Freedom of movement and absence of any friction noises on motors and pumps • Cleanliness of space (absence of fire/personnel hazards) • Evidence of saltwater leakage through rudder post packing or vent ducts	_____	_____
MI04	Inspect fuel oil service and transfer system. • Determine condition of piping and manifolds • Determine condition of fuel oil HP and LP strainers • Ensure fuel oil pump relief pump valves discharge to suction side of fuel oil pumps • Ensure no excessive fuel oil leakage exists • Ensure that spray shields are installed on flanged joints • Witness operation of fuel oil pumps • Ensure instrumentation is operable • Externally examine fuel oil heaters • Test remote operated fuel oil system valves • Determine condition of fuel oil tank vent lines and flame screens	_____	_____
MI06	Inspect bilge pumps installation, piping, and valves. • System capable of pumping from any watertight compartment except ballast, oil and water tanks • Standing water drains to suction pipes • Bilge manifold has independent bilge suction control and is properly marked • Suction strainers are installed • Emergency bilge suction installed, where required • Instrumentation operable	_____	_____
MI08	Examine refrigeration/air conditioning machinery. • Rotating machinery guards • Piping • Wiring • Pressure vessels	_____	_____
MI09	Examine potable water system. • Dedicated tanks; treated or coated • Tanks ventilated with insect screens installed • Water pump(s) and pressurization system operable	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
	• Pressure tank installation		
MI10	Determine what operational tests are required; witness tests and state if results are satisfactory. • Overspeed trips • Low lube oil shutdowns and alarms • High coolant temperature alarm	_____	_____
MI13	Inspect the diesel installation and assembly, paying particular attention to the following: • Crankcase explosion covers • Fuel and lube oil fittings (checking for leakage) • Instrumentation • Gratings and rails around the engine • Guards over rotating machinery • Exhaust system: – Leaks – Lagging – Proximity of combustible material or walkways – Water cooling system – Bulkhead penetrations • Engine foundations and tank top's structural condition • Air intakes • Crankcase vents (clear)	_____	_____
MI16	Inspect air starting systems. • Air receivers • Piping • Compressors	_____	_____
MI17	Inspect hydraulic starting systems. • Pumps and strainers • Piping • Accumulators	_____	_____
MI18	Inspect electrical starting systems.	_____	_____
MI19	Witness operational test of main propulsion diesel automation system. • Determine that the system has not been modified/jury rigged and is the same as that depicted in the procedures • Testing the automation system using the methods specified by approved procedure • Verify that automatic systems have not been bypassed or overridden by manual devices except as noted in approved	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
	test procedure		
MI19 (cont'd.)	• Verify proper operation of required alarms, shutdowns, controls and internal communications in accordance with the approved test procedure • Verify that bridge controls/alarms function in sync with engineroom control panel • Based on automation system testing, assess if vessel manning remains consistent with regulation/policies and determine corrective action, if necessary: – Temporary increase of engineroom manning – Further underway evaluation		
MI22	Internally examine unfired pressure vessels requiring internal examination. • Check for corrosion, scale, pitting, cracks and erosion • Examine welded connections internally	_____	_____
MI23	Externally examine unfired pressure vessels. • Pressure gauge • Evidence of structural damage • Data plate legible • Foundations structurally sound • Attachments secure	_____	_____
MI24	Hydrostatically test unfired pressure vessels requiring hydrostatic testing. • Determine MAWP • Observe pressure test	_____	_____
MI25	Ensure all unfired pressure vessels are properly equipped with pressure relief valves in accordance with regulations.	_____	_____
MI26	Witness pressure relief valve test. • MAWP not exceeded • Valve seats tightly • Capacity not exceeded • Correct valve type • Hand lifting device	_____	_____
PP04	Conduct an IOPP boarding and survey, and verify that required equipment is on board and in proper working order. • Segregated ballast tanks • Dedicated clean ballast tanks	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
	• Slop tanks • Monitoring equipment		
RT01	Complete Initial Indoctrination Lesson Plan Series (IILPS).	_____	_____
RT02	Complete Inspection Department Course.	_____	_____
RT06	Complete SMI Introduction Course.	_____	_____
RT08	Complete SMI Machinery Course.	_____	_____
WI01	Inspect watertight doors. • Knife edges intact and in good repair; no excessive paint buildup • Gasket material installed in channel is in good condition and not painted Knife edges and channel meet as designed when door closed • Hinges and hinge bolts in good condition; no sagging of door due to rounded out hinges or worn hinge bolts • Dogs are all operable; grease fittings still usable • Dogging wedges not excessively worn and fit up satisfactory • Quick-closing gear operable and adequate closure achieved • Any port lights installed in watertight doors use wire mesh reinforced glass • Dogging wrench provided in vicinity of watertight door(s)	_____	_____
WI02	Test power-operated watertight doors from local and remote control units.	_____	_____
WI03	Inspect watertight bulkhead penetrations. • Penetrations properly sealed to maintain watertight integrity through use of devices such as stuffing tubes • Sealant used, if stuffing tubes are employed, is non-flammable product designed for such use and is approved	_____	_____
WI05	Inspect remote-operated valves and controls. • Each valve identified as to function either by tag affixed to handle or by independent means • Each valve adequately lubricated and freely operated • Reach rods and other manual remote control mechanisms function properly • Each power-operated valve can be operated from control stations • An adequate means of control is provided to secure valves on	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
	fuel and lube oil lines to prevent pollution incident		
WI06	Inspect bilge wells and "rose boxes." • They are clear of debris; strainer plates in place • Bilge pumping system(s) function adequately (demonstrate ability of system to take suction from each bilge well) • Bilge alarms function properly	_____	_____
WI07	Inspect hull and deck openings. • Dogs, gaskets and knife edges maintained as previously described for watertight doors, on any hull or deck openings • Cargo hatches structurally sound and watertight; hatches observed in secured position to verify • Sideports and Ro-Ro Ramps, if applicable, structurally sound and watertight	_____	_____
WR01	Evaluate welding repair proposal. • Plan or sketch submitted with bill of materials • Configuration of repair acceptable • Material specification same as existing or equivalent • Method of joining acceptable	_____	_____
WR02	Complete initial visual inspection of weld repair. • Examine fit up in accordance with approved weld procedures • Examine joint preparation in accordance with approved weld procedures • Verify materials (base, filler, gas) in accordance with approved weld procedures • Verify proper preheat temperature/time in accordance with approved weld procedures • Evaluate weather conditions • Check welding equipment in accordance with approved weld procedures	_____	_____
WR03	Complete intermediate visual inspection of weld repair. • Check back gouging for full penetration weld • Check proper cleaning between weld passes • Check interpass temperatures in accordance with approved procedures • Verify that proper weld sequencing is followed • Evaluate weather conditions	_____	_____
WR04	Complete final visual inspection of weld repair. • Perform dry search to ensure welding complete and followed weld details • Perform surface inspection of welds for defects	_____	_____

MI Tasks

Task Number	*OJT Task*	*Date Completed*	*Verifying Officer*
	• Verify proper postheat temperature/time in accordance with approved weld procedures		
WR05	Witness pressure testing of welded repairs. • Witness hose testing • Witness air testing • Witness hydrostatic testing	_____	_____
WR06	Examine approved Weld Procedure Specification and Welder Performance Qualifications.	_____	_____

DATE	LOCATION	VESSEL NAME	VESSEL CLASS	INSPECTION TYPE	LEAD INSPECTOR

NOTES

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